

Work Order ID 77492

December-08-11 1:41:32 PM

\*77492\*

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ASAP

Item ID: D6104-007

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Round Billet, 17-4

Start Date: 08/12/2011 Start Qty: 12.00

\*12\*

Cust Item ID:

Required Date: 15/12/2011 Req'd Qty: 12.00

\*12\*

Customer:

Reference:

Approvals:

Process Plan: M.C.J

Date: 11/12/08

Tooling:

Date:

Run Start \*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D6104

Rev B

100

0.00

\*100\*

PURCHASING

Purchasing

Memo

0.00

Purchasing

Issue P/O: 15654 a)Description: S.S round billet b) Ø4.50" x 5.10" longc) Tolerance on all dimensions are +0.030"/-0.000" d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)e)One blank makes 2 partsf) Material certification required

CX 11/12/12 (12)

110

Receive & Inspect for Damage & Mat'l Certs

0.00

\*110\*

Packaging

Memo

0.00

Packaging

Ensure material certification is attached

11/12/21 (12)

120

QC6- Inspect dimensions to drawing

0.00

\*120\*

QC

Memo

0.00

Quality Control

Ensure Material certification comply to Dwg D6104

11/12/21

12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 77492

**\*77492\***

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Item ID: D6104-007 Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: Round Billet, 17-4  
 Start Date: 08/12/2011 Start Qty: 12.00 **\*12\*** Cust Item ID:  
 Required Date: 15/12/2011 Req'd Qty: 12.00 **\*12\*** Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: <u>MAT 47</u>	0.00							
<b>*130*</b>									
Packaging	Memo	0.00				12	4		
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
<b>*140*</b>									
QC	Memo	0.00							
Quality Control									

11/12/23  
 (12)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

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Work Order ID: 77492

\*77492\*

Parent Item: D6104-007

\*D6104-007\*

Parent Item Name: Round Billet, 17-4

Start Date: 08/12/2011

Required Date: 15/12/2011

Start Qty: 12.00

Required Qty: 12.00

Comments: IPP A: 01.05.08New Issue EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-007P		Purchased	No			110	Each	0.0000	1	12			
*D6104-007P*									**				
17-4 SS Roundbar 4.50"OD													

*Rec'd 12/21* (12)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

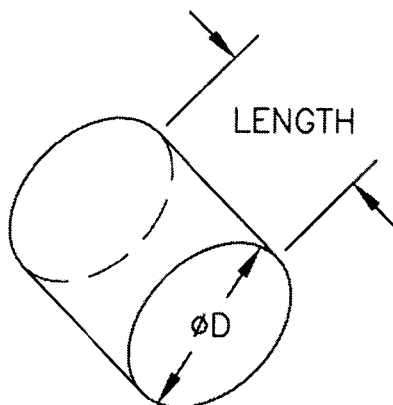
02.11.29 *[Signature]*

## SPECIFICATION CONTROL DRAWING

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

NO. 77492 *M.L.J*

*11/12/08*



MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

✓ NOTE: Date & initial all entries



**Castle Metals®**

A. M. Castle &amp; Co.

## PACKING SLIP

Page 1 of 1

Shipment No:1109629

<b>Ship From:</b> A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		<b>Sold To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		<b>Ship To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		<b>Deliver To:</b> DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
<b>Date Shipped</b> 19-DEC-2011	<b>F.O.B.</b> ORIGIN	<b>Freight Terms</b> Prepaid		<b>Carrier</b> MANITOULIN		<b>BOL No</b> 1109629-2	

<b>Shipment Details</b>	<b>Final Destination Branch - MON</b>
-------------------------	---------------------------------------

Order No	Line No	Item No	Description				
1886322	1	14998.MO	4.5000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 5.1 IN ( + .1250/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643				
Purchase Order No		Part Number		Ordered Qty		Invoice Qty	
15654		YOUR ITEM NUMBER: D6104-007		12.00 PCS		12.00 PCS	
Details							
Delivery No.	Mill	Heat Number	Mech Id	PCS	Width (IN)	Length (IN)	Shipped Qty(LBS)
109944333		528306		12			283.71

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Reviewed by Authorized Castle Metals Representative:

Date:

Name:



# Certificate of Test

HEAT 528306 ORDER 619377/ 08 BOL 0212619 \* CERTIFICATION \* 06/24/11

SHIP TO:  
A. M. CASTLE METALS  
3400 NORTH WOLF ROAD

FRANKLIN PARK 601310000

----- YOUR ORDER & DATE -----  
88972 6/24/11 CUST# 0254001 CUST TAG#14998

----- ITEM DESCRIPTION -----  
GRADE 17-4 Ship Condition CONDA  
Size 17-4 RND HRART CONDA 4.5000 x 144.000 RL  
Country of Melt: SWEDEN Country of Mfg.: UNITED STATES  
NAFTA Country of Origin is Country of Melt

No weld repair  
Free of mercury contamination, Free of radiation contamination  
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 1850

WO 2019135 Bundles: 1C

----- SPECIFICATIONS -----  
MFG TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED SWEDEN  
AMS 2303F AMS 5643R  
UNS S17400, AISI 630 ASME SA564 E10  
ASTM A484 11 ASTM A564 10 Type 630  
DFARS 252.225.7014 6/05 AMC 3174-02 R31  
Sol Ann 1900F/1Hr/Rapid Cool AISI 630, UNS S17400  
Reduction Ratio 3:1 minimum  
H900 capability sample aged at 900F/1hr/AC then tensile and HRC tested

----- MECHANICAL & OTHER TESTS -----  
Hardness as shipped 301 HB Hardness as tested 409 HB  
Hardness as shipped 032 HRC Hardness as tested ( 44 HRC )  
Grain size 7.0 Tensile strength, KSI (MPa) 202.0 (1393)  
Micro OK 0.2% Yield Strngth, KSI (MPa) 179.0 (1234)  
Intergranular corrosion OK Elongation % in 4D 13.0  
Macro OK Reduction of area % 40.0  
Ferrite .0

----- CHEMICAL COMPOSITION -----  
Carbon (C) .010 Manganese (Mn) .710  
Phosphorus (P) .022 Sulphur (S) .025  
Silicon (Si) .370 Chromium (Cr) 15.390  
Nickel (Ni) 4.720 Cobalt (Co) .060  
Copper (Cu) 3.430 Moly (Mo) .150  
Nitrogen (N) .020 Columbium (Cb) .290  
Titanium (Ti) .003 Aluminum (Al) .003  
Tin (Sn) .005 Boron (B) .001  
Tantalum (Ta) .005 Vanadium (V) .055  
Columbium/ Tantalum (Cb+Ta) .295  
Iron (Fe) Balance  
Frequency .000  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite

Severity .000

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

M.F. Marcanio